

WHAT IS CLAIMED IS:

1. A light source comprising:

an airtight container having disposed therein
5 phosphor materials that emit light by ultraviolet rays
which are radiated due to discharge;

a pair of internal electrodes disposed inside the
airtight container;

a pair of external electrodes disposed outside the
10 airtight container; and

a lamp controller that switches between an external
electrode lighting mode resulting from the application
of a voltage to the pair of external electrodes and an
internal electrode lighting mode resulting from the
15 application of a voltage to the pair of internal
electrodes, wherein

the lamp controller controls, in the external
electrode lighting mode, an electric potential V_{IN} with
respect to the pair of internal electrodes and an
20 electric potential V_H of the electrode of the higher
electric potential of the pair of external electrodes to
a condition where $V_{IN} > V_H$.

2. A light source comprising:

an airtight container having disposed therein phosphor materials that emit light by ultraviolet rays which are radiated due to discharge;

a pair of internal electrodes disposed inside the
5 airtight container;

a pair of external electrodes disposed outside the airtight container; and

a lamp controller that switches between an external electrode lighting mode resulting from the application
10 of a voltage to the pair of external electrodes and an internal electrode lighting mode resulting from the application of a voltage to the pair of internal electrodes, wherein

the lamp controller controls, in the external electrode
15 lighting mode, an electric potential V_{IN} with respect to the pair of internal electrodes and an electric potential V_H of the electrode of the higher electric potential of the pair of external electrodes to a condition where V_{IN} is substantially equal to V_H .

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3. The light source according to claim 1, wherein

the lamp controller fixes, in the external electrode lighting mode, the voltage of the pair of internal electrodes to a direct-current voltage value of
25 a condition where the electric potential V_{IN} with respect

to the pair of internal electrodes and the electric potential V_H of the electrode of the higher electric potential of the pair of external electrodes are such that $V_{IN} > V_H$ or V_{IN} is substantially equal to V_H .

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4. The light source according to claim 1, wherein a noble gas is filled inside the airtight container.

5. The light source according to claim 1, wherein
10 a gas comprising mainly xenon gas is filled inside the airtight container.

6. The light source according to claim 1, wherein the light source emits visible light in the
15 external electrode lighting mode and emits infrared light in the internal electrode lighting mode.

7. The light source according to claim 1, further comprising:

20 a direct-current high voltage supply that generates a predetermined direct-current voltage applied to the pair of internal electrodes under the control of the lamp controller.

25 8. The light source according to claim 6, wherein

the electric potential level V_{1N} is fixed at an electric potential level of the direct-current high voltage supply, in the external electrode lighting mode.

5 9. The light source according to claim 1, wherein the airtight container includes:

 a cylinder that transmits not only visible light but also infrared light; and

 a pair of caps that respectively seal so as to
10 be airtight both end portions of the cylinder.

10. The light source according to claim 9, wherein an inner surface of the cylinder includes:

 a first portion that the phosphor materials are
15 disposed as a single layer having an even thickness; and

 a second portion that the phosphor materials are not coated extending in a band along the axial direction of the cylinder.

20 11. The light source according to claim 10, wherein the cylinder further includes a reflective film that is disposed between the cylinder and the phosphor materials.

12. The light source according to claim 1, further comprising:

a switching unit that is disposed between the external electrodes and the internal electrodes; and

5 a control circuit for controlling the electric potential of the internal electrodes so that the electric potential matches an electric potential that is the same as the electric potential of the electrode whose electric potential is the higher of the external
10 electrodes, in the external electrode lighting mode.

13. The light source according to claim 1, further comprising:

a rectifying unit for controlling the electric
15 potential of the internal electrodes so that the electric potential matches an electric potential that is the same as the electric potential of the electrode whose electric potential is the higher of the external electrodes, in the external electrode lighting mode.

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14. The light source according to claim 1, further comprising:

an internal electrode-use feeder circuit for feeding the pair of internal electrodes;

an external electrode-use feeder circuit for feeding the pair of external electrodes; and

a direct-current power source, wherein:

the internal electrode-use feeder circuit and the
5 external electrode-use feeder circuit respectively includes an inverter circuit for converting direct currents from the direct-current power source to alternating currents; and

a lighting order signal is supplied from the lamp
10 controller to the respective inverter circuit.

15. An image reading device comprising:

a platen;

a light source that irradiates light onto a
15 document image including:

an airtight container having disposed therein phosphor materials that emit light by ultraviolet rays which are radiated due to discharge;

a pair of internal electrodes disposed inside
20 the airtight container; and

a pair of external electrodes disposed outside the airtight container,

a lamp controller that switches between an external electrode lighting mode resulting from the application
25 of a voltage to the pair of external electrodes and an

internal electrode lighting mode resulting from the application of a voltage to the pair of internal electrodes; and

an image sensor, wherein:

5 a reading document placed on the platen;

a lamp controller is controls an electric potential V_{IN} with respect to the pair of internal electrodes and an electric potential V_H of the electrode of the higher electric potential of the pair of external electrodes to
10 a condition where $V_{IN} > V_H$ or V_{IN} is substantially equal to V_H , in the external electrode lighting mode; and

the reading document is illuminated by the light source and a light reflected from the reading document is imaged in the image sensors.

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16. The image reading device according to claim 15, wherein

the lamp controller fixes, in the external electrode lighting mode, the voltage of the pair of
20 internal electrodes to a direct-current voltage value of a condition where the electric potential V_{IN} with respect to the pair of internal electrodes and the electric potential V_H of the electrode of the higher electric potential of the pair of external electrodes are such
25 that $V_{IN} > V_H$ or V_{IN} is substantially equal to V_H .

17. The image reading device according to claim 15,
further comprising:

5 a filter switching unit that switches filter
restricting a spectral band of imaging light to an
imaging light path in light reflected from the document
image, to match the switching between the external
electrode lighting mode and the internal electrode
lighting mode.

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18. The image reading device according to claim 15,
wherein

the light source emits visible light in the
external electrode lighting mode and emits infrared
15 light in the internal electrode lighting mode.

19. The image reading device according to claim 15,
further comprising:

20 a direct-current high voltage supply that generates
a predetermined direct-current voltage applied to the
pair of internal electrodes under the control of the
lamp controller.

20. The image reading device according to claim 15,
25 further comprising:

a scanning unit including an imaging lens and a scanning mirror; and

a scanning control unit for controlling a scanning reading position, scanning reading rate and scanning
5 direction of the scanning unit, wherein

the light reflected from the reading document is guided to the imaging lens by the scanning mirror, and imaged in the image sensor.

10 21. The image reading device according to claim 15, further comprising:

a visible light transmitting and infrared cutting filter;

a visible light cutting and infrared light
15 transmitting filter; and

a filter switching control unit for switching between the visible light transmitting and infrared cutting filter and the visible light cutting and infrared light transmitting filter, so that one of the
20 two filters is inserted in the imaging light path.